SONY

EDITSTATION

ES-3

SDI/SDTI (QSDI) INTERFACE OPTION

ESBK-3031

SERVICE MANUAL

1st Edition

⚠ WARNING

This manual is intended for qualified service personnel only.

To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

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SECTION 1
SELF-DIAGNOSIS

1-1. PREPARATION

Components required for test

- Installed ES-3 hardware and software with Main Unit, PCI Interface Card and Modular Cable
- Headphones/loudspeaker
- Video monitor with COMPOSITE and S-VIDEO inputs
- DV / DVCAM video device (for IEEE 1394 test) with reference test tape
- RS422 video device (for RS422 control test) with reference test tape

Cables required

- Serial RS232 cable 9-pin Male – 9-pin Female (1:1 assignment)
- 3 BNC – BNC video cable (about 30cm)
- S-VIDEO – 2 x BNC (chrominance/luminance) cable
- 1 S-VIDEO – S-VIDEO video cable
- 1 XLR Male – XLR Female audio cable

System preparation

The ES-3 PCI interface card must be correctly installed in the system used and connected to the Main Unit via the modular cable. A free serial connection of the PC system (COM1 or COM2) is connected to the RECORDER REMOTE connector of the Main Unit via the RS232 cable.

The other necessary video and audio cables are connected differently between the inputs and outputs of the main unit, or between the PCI interface card and the Main Unit depending on the module currently being tested. These connections are described under points **1-2. and 1-3. Description of Test Procedure** and are displayed on screen during the test.

1-2. TEST PROCEDURE FOR AUDIO AND VIDEO BOARDS

Installing the Program

To install the test program insert the CD in the CD-ROM drive and start **ES-3.Tools.Setup.exe.**
The **ES-3.Tools.Setup.exe.** must be installed from the same CD as the ES-3 Edit software on the computer.

Important

Specify the video hard drive connected to the system (e.g. R:) as the target drive for the installation.

• Starting the test

Activate the **BIST.exe** file to start the program for the audio/video test.

• Selecting the hardware to be tested and the interface to be used

When first called, the BIST program starts automatically with the select window for the various test procedures (Fig. 1).

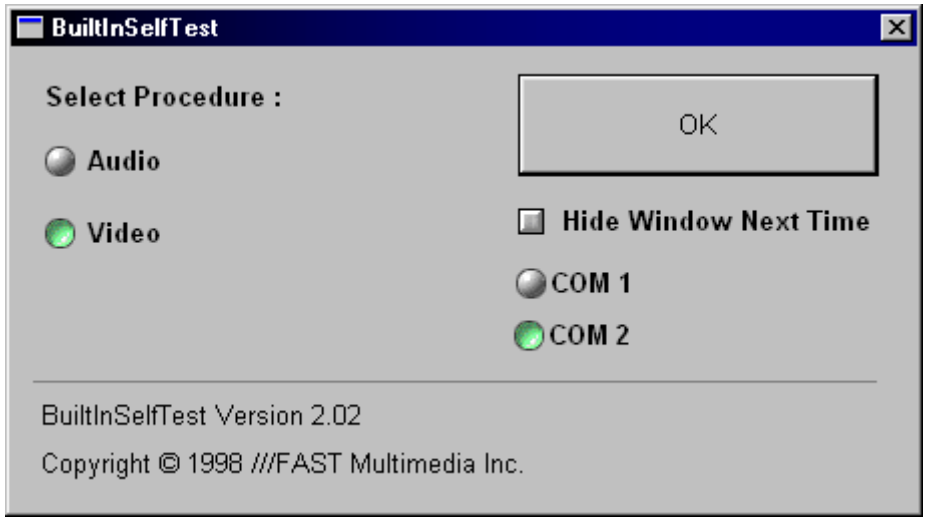

Figure 1: Selection of test procedure

1. Audio

Testing the audio board with the Built-In Self-Test (first test to be made).

2. Video

Testing the video board with the Built-In Self-Test (second test to be made).

Furthermore, in this window you must also select the COM interface (COM1 or COM2) to be used for the RS232 connection to the Main Unit. Here you should select the interface to which the serial cable on the PC is connected.

Important

For the interface used you must set the following parameters in the Windows NT setup (Start→Settings→Control Panel→Ports):

Baud Rate : 57600
Data Bits : 8
Parity : None
Stop Bits : 1
Flow Control : Hardware

If you activate the option “Hide Window Next Time”, the program skips this select window the next time it is started and continues automatically with the options you set the first time round. To change the options you can of course call the same select window separately from the program window.

• General notes on test procedure

In order to test the separate parts of the audio and video boards the test program creates internal signals for each that are then transmitted via a cable link from the **audio or video output** to the **audio or video input**. The test program then checks in each case the resulting difference signal between input and output. If the deviation between output and input signal exceeds a specific tolerance value, the component is designated to be defective.

• **Interface of the Built-In Self-Test (Fig. 2)**

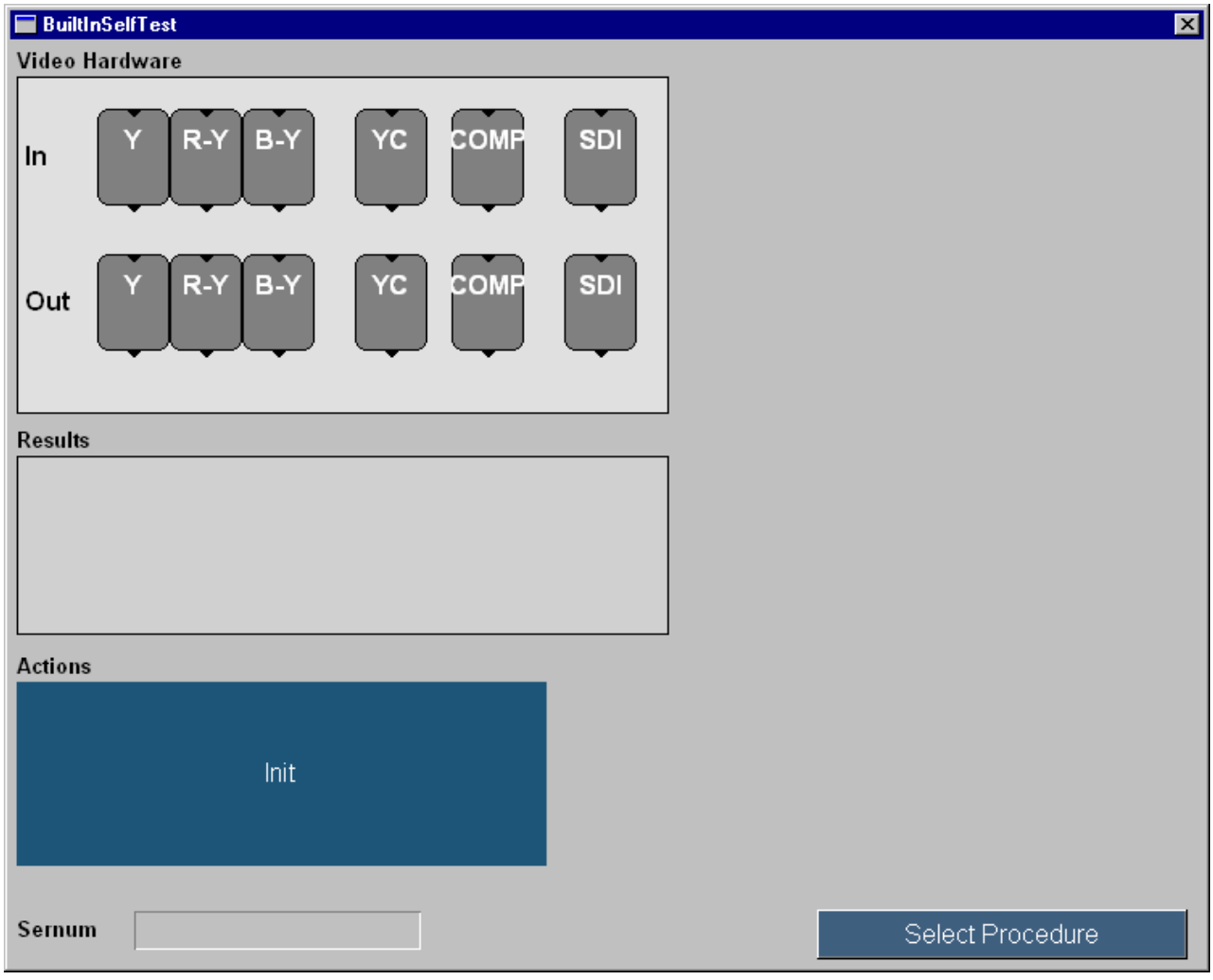

Figure 2: Interface of the Built-In Self-Test

Audio/Video Hardware

In this area the separate components of the audio or video board are represented diagrammatically and the signal path traced by lines for each test.

Results

Here the results of the tests are output as text.

Actions

In this field you click the text “Init” to initialize the system and then you get a display in text form of each step of the test to be made. Then when the test is running, two buttons appear next to this field marked “Yes/Done” and “No” which you click accordingly to designate the corresponding parts of the test as “passed” or “failed”.

Select Procedure

Press this button to open the select window for the hardware to be tested (see Fig. 1).

Example of a screen display during a test: (Fig. 3)

Figure 3: Display during the COMPOSITE (COMP) Input test (example)

• Starting the test with Init

Click **Init** in the Actions box to initialize the ES-3 hardware and start the test.
(Initialization can take up to one minute).

1. Audio Test

You need at least one XLR Input/Output cable for the audio test. Using a second cable speeds up the test, because less cable connections have to be reconnected.

An individual audio component is designated as “passed” if the signal-to-noise ratio is greater than 70dB.

Proceed as follows for the audio test:

a) CH-1 Input / Output Test
Connect CH-1 OUT to CH-1 IN. Is the signal-to-noise ratio OK?

b) CH-2 Input / Output Test
Connect CH-2 OUT to CH-2 IN. Is the signal-to-noise ratio OK?

c) CH-3 Input Test
Connect CH-1 OUT to CH-3 IN. Is the signal-to-noise ratio OK?

d) CH-4 Input Test
Connect CH-1 OUT to CH-4 IN. Is the signal-to-noise ratio OK?

e) AES/EBU Input / Output Test
Connect AES / EBU OUT to AES / EBU IN. Is the signal-to-noise ratio OK?

Test passed
Audio Board

The audio test is completed after the AES/EBU Input / Output test and the audio board can be designated as “passed”.

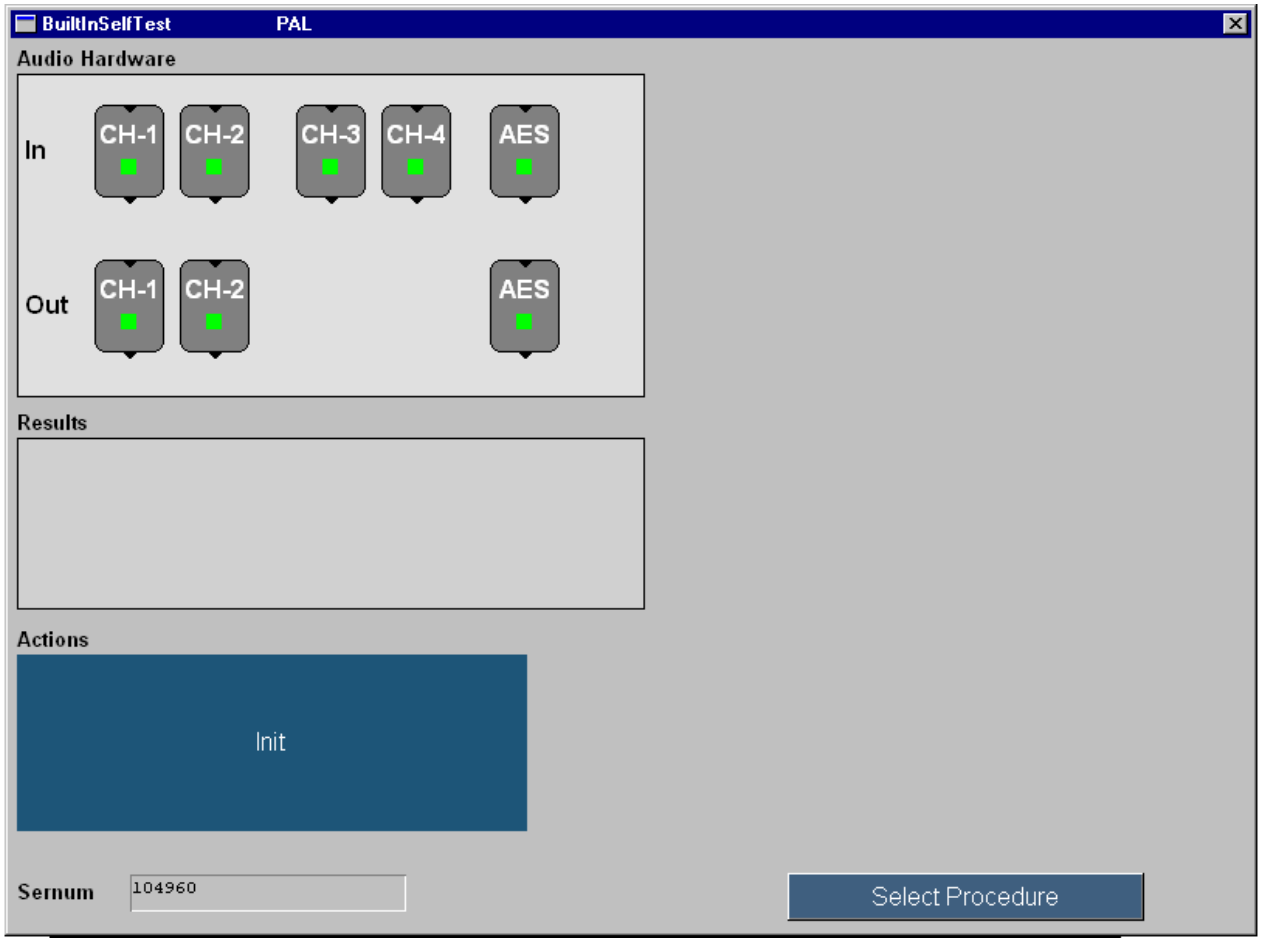

Figure 4: Display after positive termination of the audio test

2. Video Test

The following cables are required for the video test:

- 3 BNC – BNC video cable (approx. 30 cm)
- S-VIDEO – 2 x BNC (chrominance/luminance) cable
- 1 S-VIDEO – S-VIDEO video cable

For all video tests the bottom right window displays the resulting difference pattern. This can contain black, green, yellow and red areas each signifying something different as follows.
Black: no difference (optimum).
Green: slight difference (still in tolerance range).
Yellow and Red: great difference (failed).
In addition, the differences for the Y, R-Y, B-Y component values are also displayed in the Results window as numeric values. In this case a component is considered as “failed” when one of the values is greater than 10. Then you can abort the test and simply replace the entire video board. Yellow or red difference values in the color transition areas of the test pattern can be ignored.

a) COMPOSITE Output Test
   Connect COMPOSITE OUT to a monitor. Are the two color bars to be seen?

b) COMPOSITE Input Test
   Connect COMPOSITE OUT to COMPOSITE IN. Are the difference pattern and the Y, R-Y, B-Y values in the tolerance range?

c) S-VIDEO Output Test
   Connect S-VIDEO OUT to a monitor. Are the two color bars to be seen?

d) S-VIDEO Input Test
   Connect S-VIDEO OUT to S-VIDEO IN. Are the difference pattern and the Y, R-Y, B-Y values in the tolerance range?

e) SDI Input / Output Test
   Connect SDI OUT to SDI IN. Are the difference pattern and the Y, R-Y, B-Y values in the tolerance range?

f) Y Input Test
   Connect COMPOSITE OUT to Y IN. Are the difference pattern and the Y, R-Y, B-Y values in the tolerance range?

g) Y Output Test
   Connect Y OUT to Y IN. Are the difference pattern and the Y, R-Y, B-Y values in the tolerance range?

h) R-Y Input Test
   Connect S-VIDEO OUT to Y IN (S-VIDEO on double BNC cable, luminance) and COMPOSITE OUT to R-Y IN. Are the difference pattern and the Y, R-Y, B-Y values in the tolerance range?

i) R-Y Output Test
   Connect Y OUT to Y IN and R-Y OUT to R-Y IN. Are the difference pattern and the Y, R-Y, B-Y values in the tolerance range?

j) B-Y Input Test
   Connect S-VIDEO OUT to Y IN (S-VIDEO on double BNC cable, luminance) and COMPOSITE OUT to B-Y IN . Are the difference pattern and the Y, R-Y, B-Y values in the tolerance range?

k) B-Y Output Test
   Connect Y OUT to Y IN and B-Y OUT to B-Y IN. Are the difference pattern and the Y, R-Y, B-Y values in the tolerance range?

Test passed
Video Board

The video test is completed after the B-Y Output Test and the video board can be designated as “passed”.

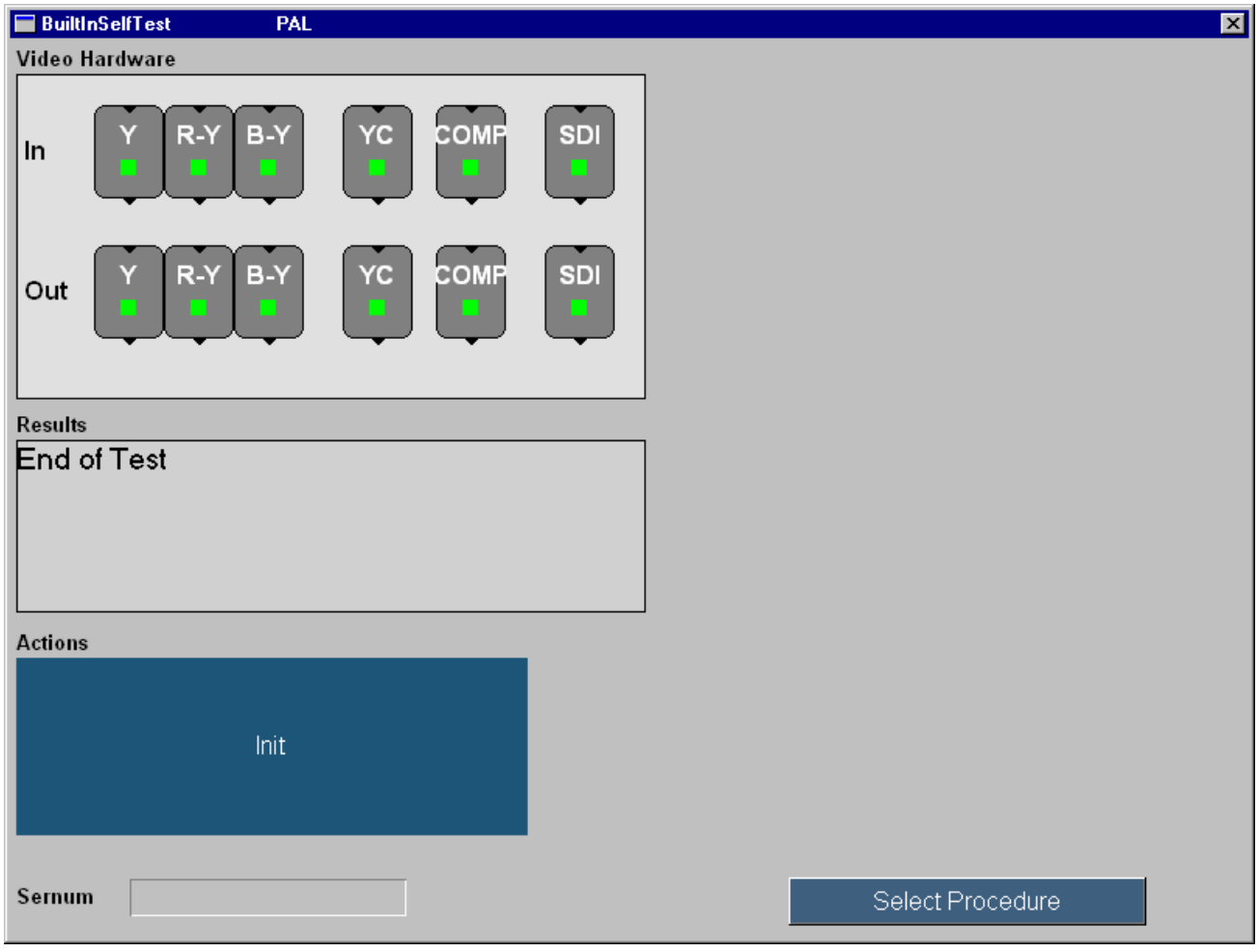

Figure 5: Display after completed video test

• Possible error sources

If the difference pattern is almost completely red in video test, this means that the program could not detect any input or output in the current test. Check the cable connections and run the test again.

1-3. TEST PROCEDURE FOR PCI INTERFACE CARD AND CONTROL BOARD

• Preparation

Before starting a test there must be an S-VIDEO connection between the Preview Monitor OUT of the PCI interface card and the S-VIDEO IN of the Main Unit. The Control Panel must be correctly connected to the PCI interface card. Headphones or loudspeakers must be connected to the audio output of the cable splitter.
The test program and the associated data files must be located on a hard disk that can guarantee a data transfer rate of 8 MB/s. If a video RAID is available, you should use it. You must specify this hard disk as the target drive when installing the test program. Inferior data rates may result in corrupted test results (all AvDv modules will then be designated as “test failed”).

• General notes on test procedure

The test for the PCI interface card and the AvDv modules of the Control Board generates test signals for the individual components on the boards. These test signals are then compared with stored reference data. If the difference between the two signals is too great, the program outputs “Test failed” for the component concerned.

• Starting the test

The test is started by calling **Start→Programs→EditStation ES-3 Tools→PCI Interface + AvDv Test.** After initialization (which can take up to two minutes) the program starts the test. No other input is required.

The components TM1, MIXA and DENC are automatically tested by the program and the test output is displayed in the **Test State** field.

For the Control Panel test you must turn the jog/shuttle wheel briefly when prompted by the program. This prompt is displayed in the **Current Information field**. The headphone/audio output is also checked during the Control Panel test. A sound of 1kHz is output for testing and this can be checked acoustically via the headphones or loudspeakers.

Test passed

If all the components are output with “Test passed”, the PCI interface card is designated as “passed”. Two more tests are required for checking the Control Board in the Main Unit as described below.

Test failed
AvDv modules

If one of the tests for the AvDv modules 1/2/3 is output as “Test failed” and all the other tests (TM1, MIXA, DENC and Control Panel) as “passed”, exchange DVBK-1 on the failed AvDv module to another DVBK-1 on the passed AvDv module. If the AvDv still fails, you must replace the Control Board of the Main Unit.
If the failed AvDv module become passed and passed AvDv module become failed, you must replace DVBK-1 on the failed AvDv module.

Test failed
TM1, MIXA, DENC

If one of the TM1, MIXA, DENC tests is output as “Test failed”, the test must be repeated using a reference Main Unit (a replacement component that has been tested as 100% OK) in order to ensure that these components do not influence the test. If the test returns the same results on this second reference test run as on the first test run, the PCI interface card must be replaced.

Test failed
Control Panel

If one of the Control Panel tests is output as “Test failed”, the test must be repeated using a reference Control Panel (replacement component that has been tested as 100% OK). If the test returns the same results on this second reference test run as on the first test run, the PCI interface card must be replaced.

If the Control Panel test outputs “passed” on this second reference run, then you must replace the Control Panel.

Figure 6 shows the screen display after a test has been passed.

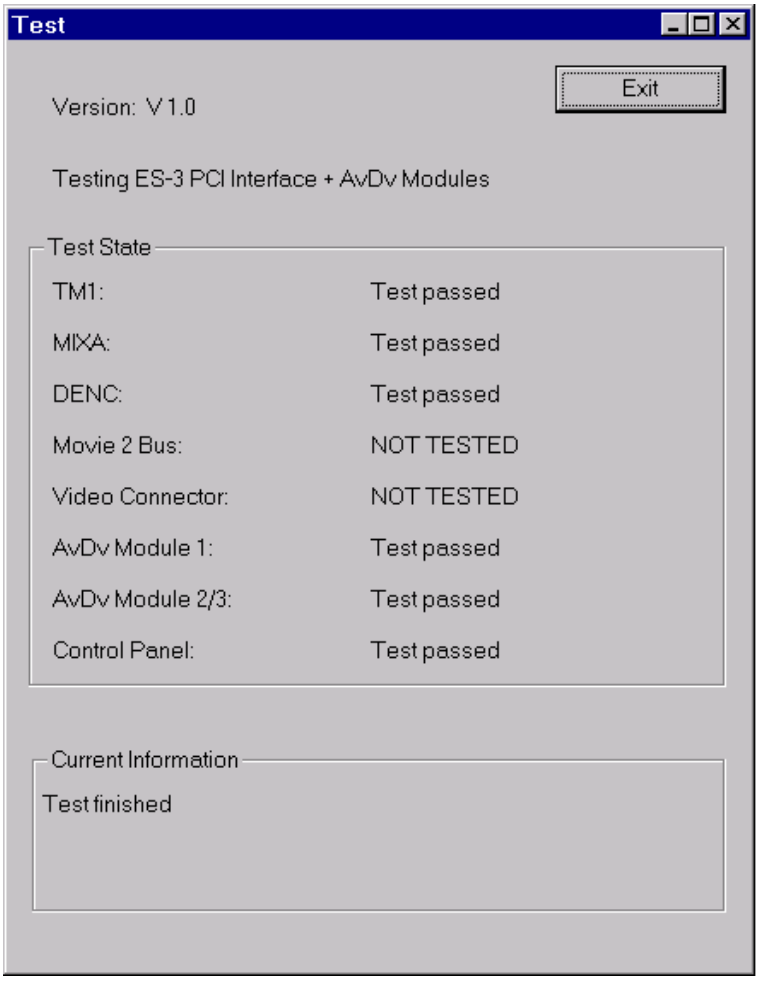

Figure 6: PCI interface card test passed

• Possible error sources:

Possible error sources that might affect the test results: incorrect or defective video connection between PCI interface card and Main Unit (DENC test failed), or the hard disk used doesn’t have a high enough data transfer rate (AvDv tests failed).

• Testing the i.Link and RS422 Controllers

The hardware components of the Control Board that control the video devices must be tested directly in the ES-3 application. Depending on the error description, it will be necessary to test the i.Link controller and/or the RS422 controller. For this the video devices must be available with tape material and connected to the Main Unit.

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Test procedure with i.Link devices:

a) Connect the video device to the **DV IN** connector on the Main Unit.
b) Start the application by calling “EditStation ES-3”.
c) Open the Logging Tool window via Start/Tools/Logging Tool.
d) Create a new reel for the test.
e) Switch to the i.Link IN connection at the bottom left (check in the Player Settings under Connections that the i.Link IN and IN/OUT are assigned to the corresponding connection of the Main Unit. See also the ES-3 operation manual).
f) Test whether the device reacts correctly to all control functions (Play, Stop, Rewind, Forward).
g) Log a clip of 30 seconds in length.
h) Close the Logging Tool, play back the clip and check the output on the monitor.

Repeat the test with a device connected to the DV IN/OUT connector on the Main Unit and check whether the signal is output again via the i.Link interface during playback.

Test procedure with RS422 devices:

a) Connect the video device to a VIDEO IN connector (COMPOSITE or S-VIDEO or Y/R-Y/B-Y or SDI) on the Main Unit. You must select the video input for the Player device in Player Settings under Connections (see the ES-3 operation Manual).
b) Connect the RS422 interface of the video device to the Player interface of the Main Unit.
c) Start the application by calling “EditStation ES-3”.
d) Open the Logging Tool window via Start/Tools/Logging Tool.
e) Create a new reel for the test.
f) Switch to the PLAYER connection at the bottom left
g) Test whether the device reacts correctly to all control functions (Play, Stop, Rewind, Forward).

Test passed
Control Board

If these two procedures run through without any restrictions and all the AvDv modules are output as “passed” in the PCI interface card test, then the entire Control Board can be designated as “passed”. If problems arise with the DV IN/OUT test or RS422 test, then you should run these tests through a second time. If the problems persist, then you should replace the Control Board.

SECTION 2
SPARE PARTS

2-1. NOTES ON REPAIR PARTS

(1) Safety Related Components Warning
Components marked ⚠ are critical to safe operation. Therefore, specified parts should be used in the case of replacement.

(2) Standardization of Parts
Spare parts supplied from Sony Parts Center may not be always identical with the parts which actually in use due to “accommodating the improved parts and/or engineering changes” or “standardization of genuine parts”.
This manual’s exploded views and electrical spare parts list are indicating the part numbers of “the standardized genuine parts at present”.

(3) Stock of Parts
Parts marked with "o" SP (Supply Code) column of the spare parts list are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional delivery time.

(4) Units for Capacitors, Inductors and Resistors
The following units are assumed in schematic diagrams, electrical parts list and exploded views unless otherwise specified.

Capacitors : μF
Inductors : μH
Resistors : Ω

2-2. PARTS LIST

ES-3(UC,CE) PARTS LIST

Q'ty	Part No.	SP	Description
1pc	9-881-345-01	s	Video Board
1pc	9-881-346-01	s	Audio Board(E)
1pc	9-881-351-01	s	Fan(Audio)
3pcs	1-568-005-11	o	Connector, 3-Pin XLR Type(Male)
5pcs	1-568-006-11	o	Connector, 3-Pin XLR Type(Female)
1pc	9-881-348-01	s	Control Board
3pcs	8-498-064-10	o	DVBK-1 Board
1pc	9-881-349-01	o	Back plane Board
1pc	9-881-350-01	o	Front Board
1pc	⚠ 9-881-352-01	o	Power Unit
1pc	9-881-353-01	s	Power Board
1pc	⚠ 9-881-354-01	s	Switching Regulator
1pc	⚠ 9-881-355-01	s	AC Inlet
1pc	9-881-356-01	o	Front Panel
1pc	9-881-357-01	o	Switch Button
2pcs	9-881-358-01	o	Spring
2pcs	9-881-360-01	s	Fan(Chassis)
4pcs	9-881-361-01	o	Foot

SUPPLIED ACCESSARIES LIST

Q'ty	Part No.	SP	Description
1pc	9-881-362-01	s	TMIX Board
1pc	9-881-363-01	s	Modular Cable
1pc	⚠ 1-551-812-11	s	Power Supply Cord (for UC)
1pc	⚠ 1-782-929-11	s	Power Supply Cord (for CE)
1pc	3-864-654-11	s	Installation Manual(E) (For UC, CE)
1pc	3-864-654-21	s	Installation Manual(F) (For UC, CE)
1pc	3-864-654-31	s	Installation Manual(G) (For CE)
1pc	3-864-654-41	s	Installation Manual(I) (For CE)
1pc	3-864-654-51	s	Installation Manual(S) (For UC, CE)

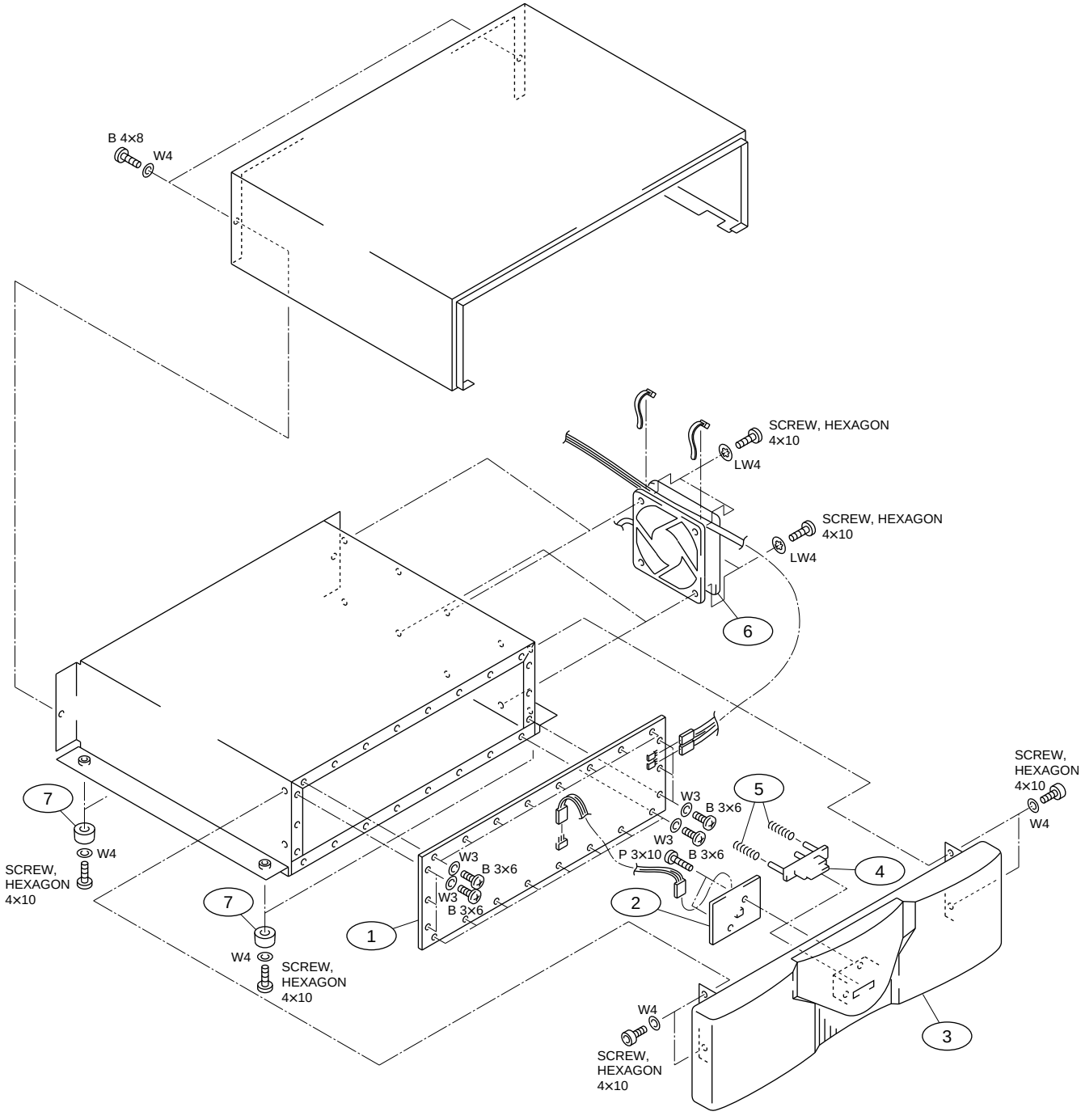
OPTIONAL ACCESSARIES LIST

ESBK-3031, SDI/SDTI(QSDI) Interface Option

ESBK-3091E, Operation Manual(E)
ESBK-3091F, Operation Manual(F)
ESBK-3091G, Operation Manual(G)
ESBK-3091I, Operation Manual(I)
ESBK-3091S, Operation Manual(S)

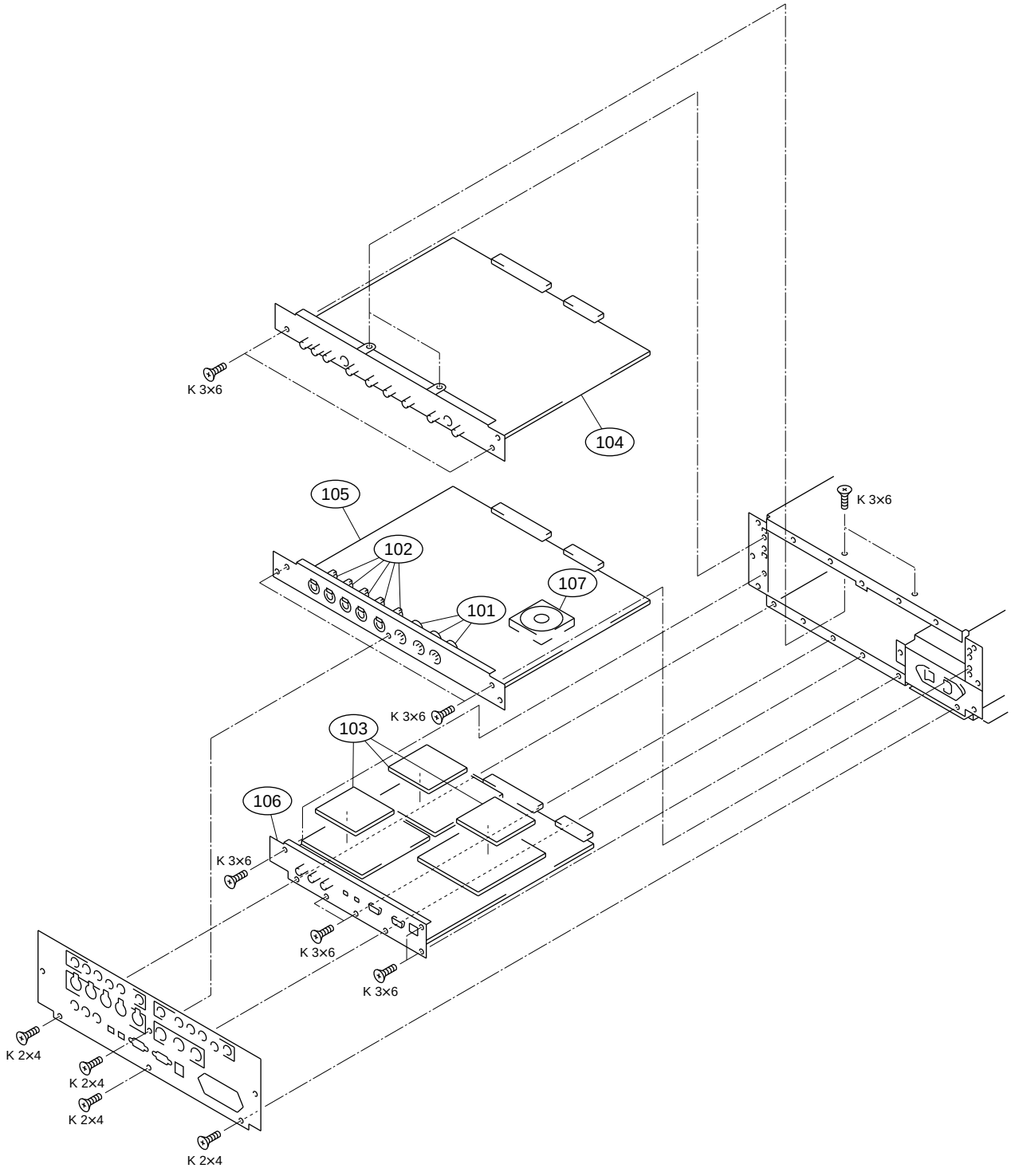
2-3. EXPLODED VIEWS

FRONT PANEL



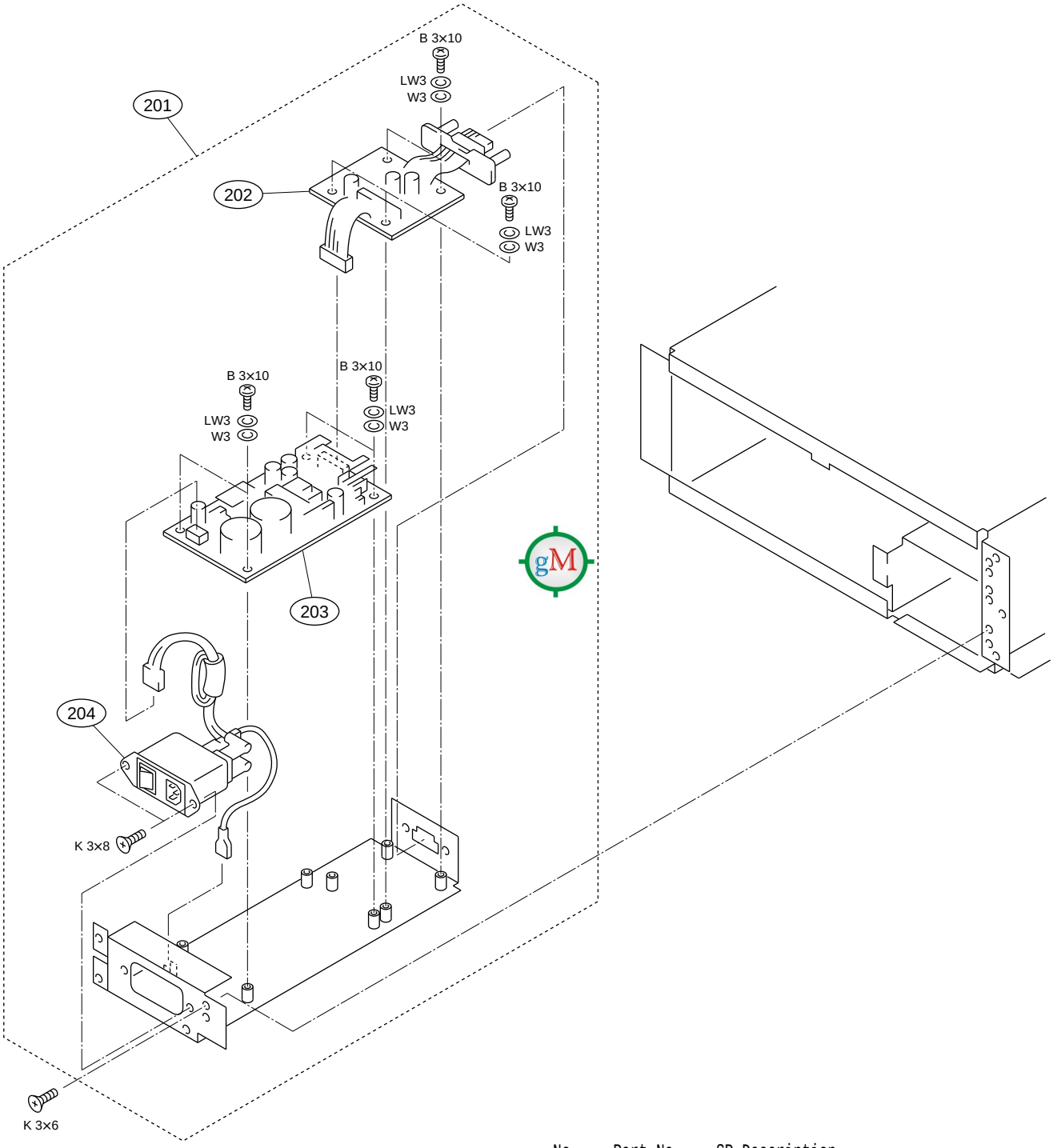
No.	Part No.	SP	Description
1	9-881-349-01	o	BACK PLANE BOARD
2	9-881-350-01	o	FRONT BOARD
3	9-881-356-01	o	FRONT PANEL
4	9-881-357-01	o	SWITCH BUTTON
5	9-881-358-01	o	SPRING
6	9-881-360-01	s	FAN(CHASSIS)
7	9-881-361-01	o	FOOT

REAR PANEL



No.	Part No.	SP	Description
101	1-568-005-11	o	CONNECTOR, 3-PIN XLR TYPE(MALE)
102	1-568-006-11	o	CONNECTOR, 3-PIN XLR TYPE(FEMALE)
103	8-498-064-10	o	DVBK-1 BOARD
104	9-881-345-01	s	VIDEO BOARD
105	9-881-346-01	s	AUDIO BOARD(E)
106	9-881-348-01	s	CONTROL BOARD
107	9-881-351-01	s	FAN(AUDIO)

POWER SUPPLY



No.	Part No.	SP	Description
201	⚠ 9-881-352-01	o	POWER UNIT
202	9-881-353-01	s	POWER BOARD
203	⚠ 9-881-354-01	s	SWITCHING REGULATOR
204	⚠ 9-881-355-01	s	AC INLET

SECTION 3
BLOCK DIAGRAM

3-1. OUTLINE

The hardware for the ES-3 consists of the main unit and the PCI interface board (TMIX), and the main unit itself consists of the three major boards for video, audio, and control, and the power unit.

The video board has on it, various analog video input/output circuits, A/D and D/A converters, and SDI/SDTI (QSDI) digital input/output interface circuits.

The audio board has on it, analog audio input/output circuits, A/D and D/A converters, and AES/EBU digital input/output interface circuits.

The control board holds three DVBK-1 boards on it, and has the circuits for DV encoding/decoding, DV digital input/output interface (IEEE1394), RS-422 VTR control, and GEN LOCK (generator lock). It also controls data communication with the PCI interface board.

The TMIX board communicates A/V data with the SCSI interface A/V hard disk drive through the PCI bus of a computer. It also processes real-time effect on audio/video signals.

3-2. SIGNAL PATH

Analog or SDI signals are fed into the main unit where they are first encoded by the control board, DVBK-1 (No.2), and stored into the A/V hard disk drive through the TMIX board. In the meantime, non-compressed data is sent to the TMIX board for monitoring.

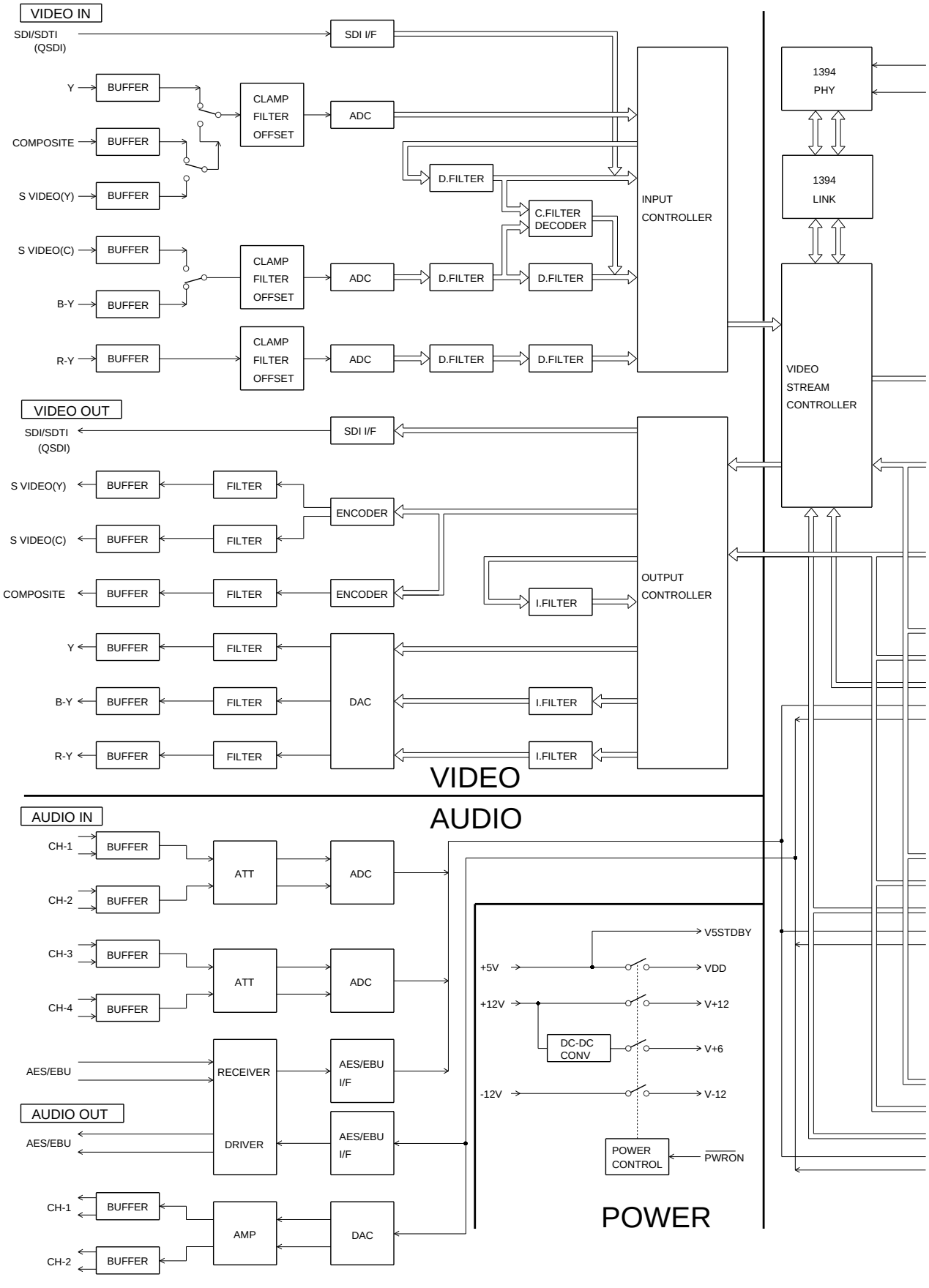
DV or SDTI (QSDI) signals, which are DV encoded, are stored into the A/V hard disk drive through the TMIX board. In the meantime, the signals are decoded by the control board, DVBK-1(No.1) and sent to the TMIX board for monitoring.

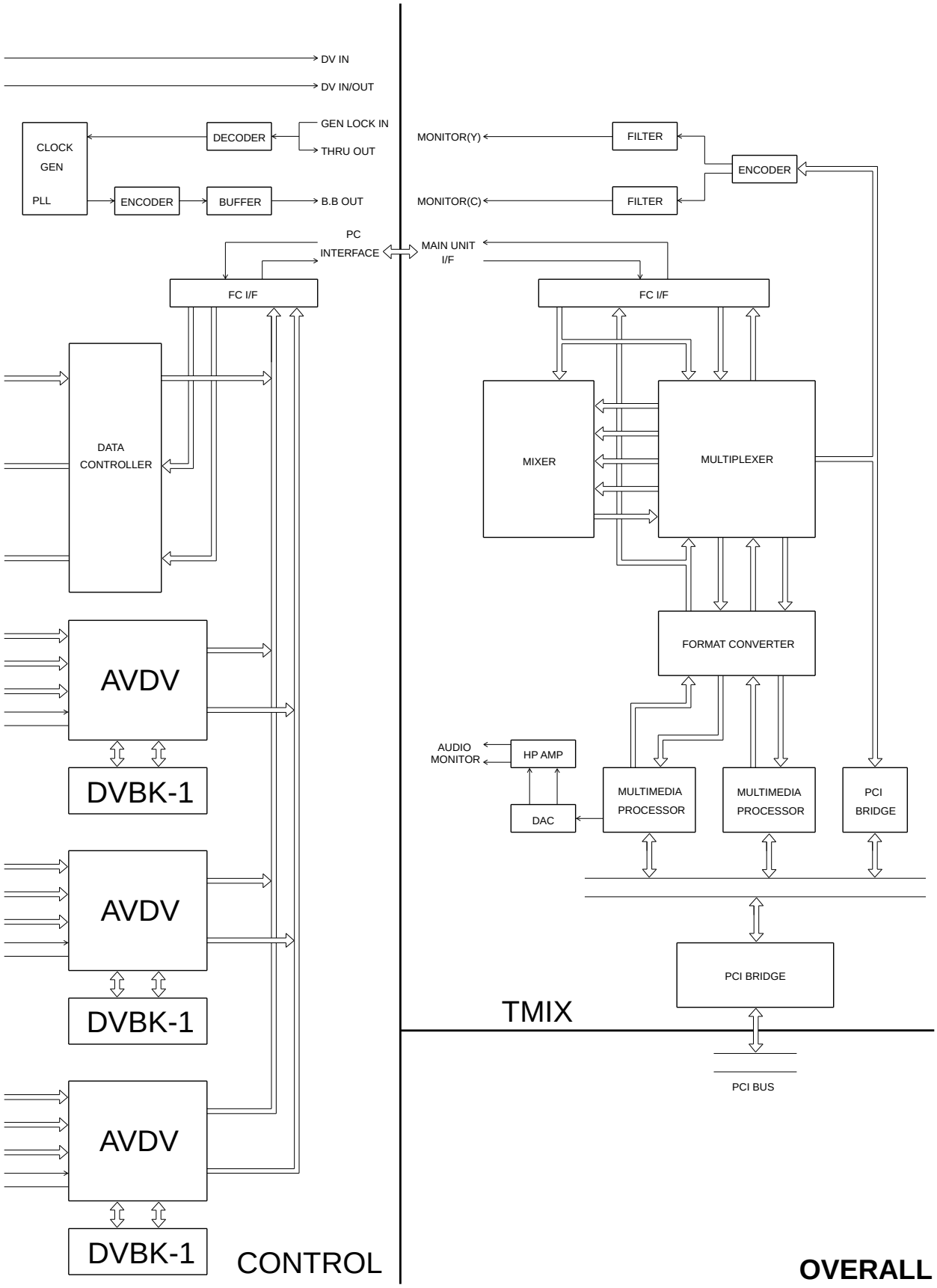
In playback mode, the signals from the A/V hard disk drive is sent through the TMIX board to the control board, DVBK-1 (No.1 and No.3) for decoding and sent back to the TMIX board, where special effect is processed on them (two channels are simultaneously processed, in case of real-time effect.)

Special-effected signals are sent through the control board to the video and audio boards, where they are converted into those in various formats and outputted. For DV or SDTI (QSDI) output, the signals are encoded by the control board, DVBK-1 (No.2) and outputted.

Note : The location of DVBK board
DVBK-1 (No.1) : Left /close position with the control board looked from the rear panel
DVBK-1 (No.2) : Right/center position with the control board looked from the rear panel
DVBK-1 (No.3) : Left/far position with the control board looked from the rear panel

3-3. BLOCK DIAGRAM




DV IN
DV IN/OUT
CLOCK GEN
PLL
DECODER
GEN LOCK IN
THRU OUT
ENCODER
BUFFER
B.B OUT
PC INTERFACE
FC I/F
DATA CONTROLLER
AVDV
DVBK-1
AVDV
DVBK-1
AVDV
DVBK-1
CONTROL
MONITOR(Y)
MONITOR(C)
FILTER
FILTER
ENCODER
MAIN UNIT I/F
FC I/F
MIXER
MULTIPLEXER
FORMAT CONVERTER
AUDIO MONITOR
HP AMP
DAC
MULTIMEDIA PROCESSOR
MULTIMEDIA PROCESSOR
PCI BRIDGE
PCI BRIDGE
TMIX
PCI BUS

OVERALL

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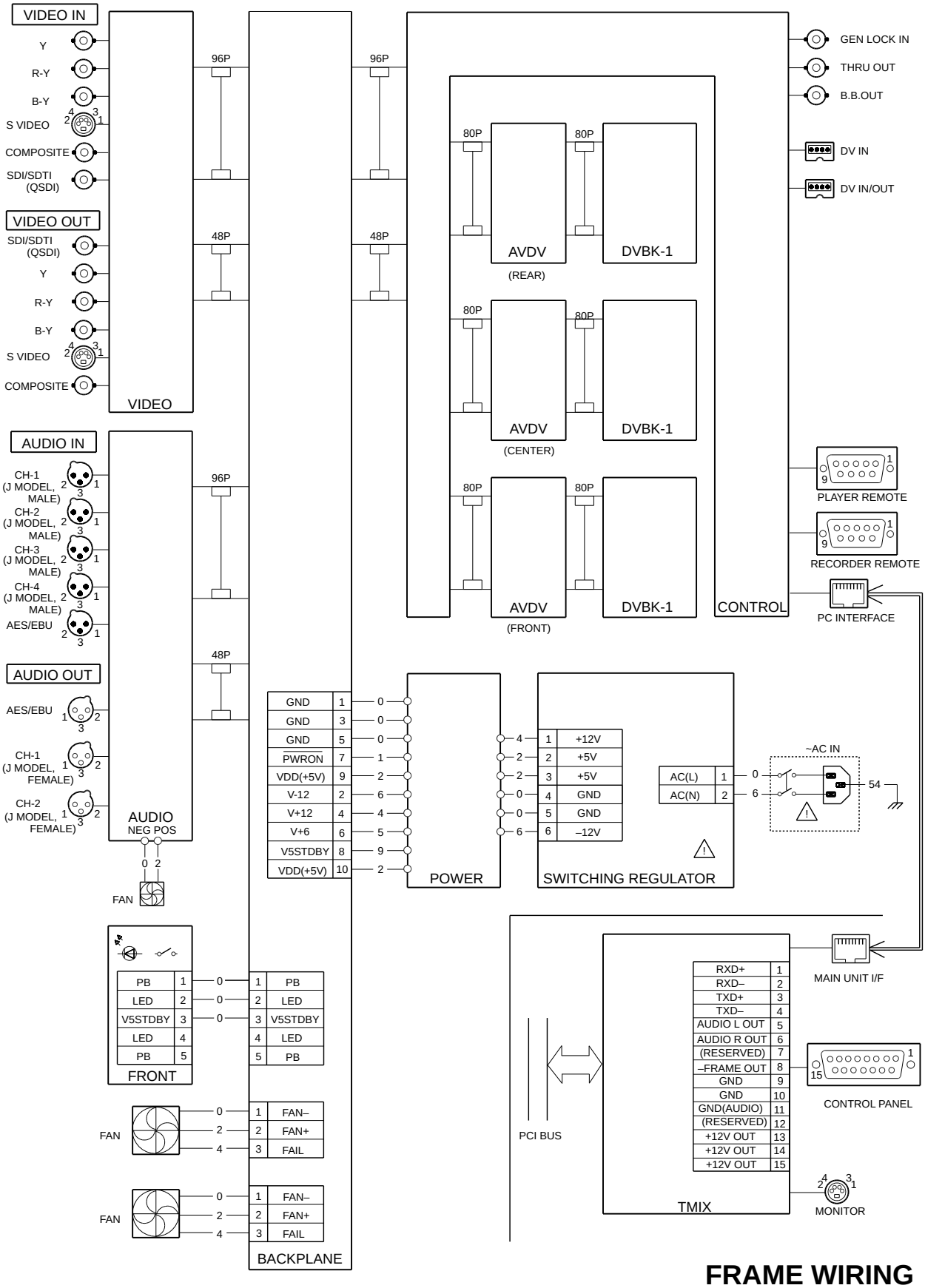
SECTION 4
FRAME WIRING



FRAME WIRING

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